

REMARKS

The Examiner is thanked for the careful examination of the application, and for the indication of allowable subject matter. However, in view of the foregoing amendments and remarks, the Examiner is respectfully urged to reconsider and withdraw the outstanding rejections.

Claim Rejections-35 U.S.C. §112:

In response to the rejection of claim 5, that claim has been amended to overcome the issues raised by the Examiner. If the Examiner is of the opinion that further issues remain with regard to 35 U.S.C. §112, second paragraph, the Examiner is respectfully urged to telephone the undersigned so that prosecution of the application may be expedited.

Art Rejections:

Claim 1-2 have been rejected under 35 U.S.C. §102(b) as being allegedly anticipated by U.S. Patent No. 5,304,883, hereinafter Denk.

Denk discloses a ring wound stator having a variable cross-section conductor.

Claim 1 defines a hybrid synchronous motor with a toroidal winding comprising a rotor and a stator, wherein the stator has at least one assembly of coaxially displaced ferromagnetic rings, the rings having ferromagnetic cogs both on inner and outer circumferences thereof. The assembly is provided with a polyphase toroidal coil made of coil segments so that a coil wire is lying between the cogs. Claim 1 has been amended to clarify that the cogs are ferromagnetic, as are the ferromagnetic rings.

In contrast to the motor of claim 1, the elements in Denk that are referred to by the Examiner as the cogs are actually insulating spacers. See column 3, lines 45-48.

Accordingly, from the structural point of view, the insulating spacers 50 in Denk are quite different than the ferromagnetic cogs of the stator rings. Accordingly, amended claim 1 is clearly patentable over Denk. Accordingly, the rejection of claim 1 should be withdrawn.

Claim 2 depends from claim 1, and is thus also patentable over Denk at least for the reasons set forth above with respect to claim 1.

Claim 6 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Denk in view of U.S. Patent No. 4,398,108, hereinafter Danilevich. The Examiner relies upon Danilevich only for an alleged teaching of filling gaps between the rotor and the stator with a ferromagnetic liquid. However, Danilevich does not otherwise overcome the deficiency of Denk with respect to amended claim 1. Accordingly, claim 6 is also patentable over the applied prior art.

At the present time, Applicants do not address the propriety of the combination of Denk with Danilevich. Applicants reserve the right to address this issue at a later time, if necessary and appropriate.

The Examiner has already indicated that claims 3-4 contain allowable subject matter.

New claim 7 has been added to define the subject matter cancelled from claim 6. Accordingly, claim 7, which depends from claim 6, is also patentable over the cited prior art.

In the event that there are any questions concerning the foregoing amendments or remarks, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

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Mark-up of Claims 1-6

1. (Amended) A hybrid [Hybrid] synchronous motor with a toroidal winding comprising:

a rotor and a stator,

the stator having at least one assembly [(7)] of coaxially displaced ferromagnetic rings [(2, 3) which are cogged], the rings having ferromagnetic cogs both on inner and outer circumferences thereof, and

the assembly [(7)] being provided with a polyphase toroidal coil [(6)] made of coil segments so that a coil wire is lying between the cogs [(2a, 3a, 2b, 3b)].
2. (Amended) The [A] hybrid synchronous motor according to claim 1, [wherein] further comprising a plurality of the stator assemblies [(7) have a common] and wherein the toroidal coil [which] is formed around all of [them] stator assemblies simultaneously, and wherein the common toroidal coil is wound around or assembled from U-shaped copper parts.
3. (Amended) The [A] hybrid synchronous motor according to claim 1 [or 2], wherein the rotor includes one pair of inner and outer rotor assemblies [(16a, 16b)] that is mounted to each stator assembly [(7)], each rotor [stator] assembly including two coaxially displaced rotor rings [(17a, 18a or 17b, 18b)], each rotor ring [is] being formed with rotor

poles in the form of cogs which are equally spaced along a circumferential direction, so that the poles of each of the rotor rings [(17a, 17b)] are angularly shifted for one half of a rotor pole division relative to the poles of the other corresponding one of the rotor rings [(18a, 18b)], respectively.

4. (Amended) The [A] hybrid synchronous motor according to claim [any one of claims 1 to] 3, wherein

either one axially magnetized disk is inserted between the cogged stator rings [(2, 3)] of each assembly [(7)], or two such disks are inserted between the adjacent cogged rotor rings [(17a, 18a) and (17b, 18b)], and wherein

the disk or the disks are producing transverse magnetic flux in the inner and in the outer air gaps between the rotor and stator.

5. (Amended) The [A] hybrid synchronous motor according to claim 3 [any one of claims 1 to 4], wherein

four sets of rotor poles [(19a, 19b, 20a, 20b)] have the same number of poles, and four sets of stator poles [(2a, 3b, 3a, 3b)] also have the same number of poles, [but these two numbers slightly differ] and the number of rotor poles differs from the number of stator poles if the stator poles are equally spaced along a circumferential direction.

6. (Amended) The [A] hybrid synchronous motor according to claim 1, wherein

the gaps between the rotor and the stator are filled with a liquid, [preferably ferromagnetic liquid] which improves heat transport from a motor interior and reduces mechanical vibrations.